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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

File: 1BR-THI1722/
Amendment No. 1

September 15, 2017

Olivier Simard
Qikiqtaaluk Environmental Inc.
P.O. Box No. 1228,
Iqaluit, Nunavut X0A 0H0

Email: osimard@qenv.ca

Subject: Water Licence 1BR-THI1722 Type "B" – Amendment No.1

Dear Mr. Simard,

Please find attached, Amendment No.1 to Licence No. 1BR-THI1722 Type "B" issued to Qikiqtaaluk Environmental Inc. (QE or the Licensee or the Applicant) by the Nunavut Water Board (NWB or the Board) (Motion No. **2017-B1-028**) pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada and the Nunavut Waters and Nunavut Surface Rights Tribunal Act (the Nunavut Agreement).* The Terms and Conditions of the Licence 1BR-THI1722 (the Existing Licence), related to the use of Water and deposit of Waste remain integral parts of this approval.

The Licensee is advised that although this Amendment was exempted from the requirements of screening by the Nunavut Impact Review Board (NIRB) and of review by the Nunavut Planning Commission, in accordance with s.12.4.4 (a) of the Nunavut Land Claim Agreement (NLCA), the NIRB's Screening Decision Report[1] for the file should continue to be consulted in as it contains recommendations that are applicable to the overall project scope.

[1] Nunavut Impact Review Board (NIRB) Screening Decision Report, April 15, 2016

The NWB strongly recommends that the Licensee consult the comments[2] received from interested persons on issues identified in relation with the amendment application. This information is included for your consideration.

Sincerely,

Lootie Toomasie
Chair
Nunavut Water Board

TK/sa/rd

Enclosure: **Licence No. 1BR-THI1722 - <u>Amendment No. 1</u>**
Comments: INAC and ECCC

cc. Qikiqtani Distribution List

[2] Indigenous and Northern Affairs Canada (INAC)'s Review dated August 23,2017 and Environment and Climate Change Canada (ECCC)'s Review, dated August 24, 207

LICENCE AMENDMENT No. 1

Licensee:	**Qikiqtaaluk Environmental Inc.**
Renewed Licence No:	**1BR-THI1722, Type "B"**
Licence Issued:	**May 4, 2017**
Expiry Date:	**May 3, 2022**

Background

The Environmental Waste Processing Facility (EWPF), operated by Qikiqtaaluk Environmental Inc. (QE or the Licensee or the Applicant) is located within the limits of the City of Iqaluit, Nunavut. Activities at the EWPF, in what concerns to waste management are primarily regulated under Type "B" Water Licence 1BR-THI722 (the Existing Water Licence), including:

- treatment of water impacted by hydrocarbons, organic compounds and or metals at a Water Treatment Facility (WTF);
- treatment of hydrocarbon contaminated soils through a biopile (landfarming); and
- operation of a Hazardous Waste Transfer Centre.

Further to this, and provided that the effluent discharge limits set by the Nunavut Water Board under the Existing Water Licence are met, QE is authorized to discharge to the environment the WTF's treated effluent. In addition, Effluent discharge limits or Effluent Quality Criteria (EQC) for the authorized discharge of the WTF's effluent to the environment established by the Board under *Part E, Item 14* of the Existing Licence are based on the *Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life for Surface Water Reception.*

On July 31, 2017 the Licensee submitted an Application for the Amendment of the Water Licence 1BR-THI1722 (the Application). The Application states that the effluent discharge limits as set in the Existing Water Licence are not attainable by the current WTF's treatment methods or in other words, it has been noticed that after treatment, the treated water quality does not meet the required water quality set under *Part E, Item 14* of the Existing Water Licence; for that reason, the Licensee applied to the NWB for an amendment to the Existing Water Licence.

Further to that, the Applicant proposes new discharge limits for the WTF's treated effluent; specifically, the Applicant proposes that the NWB set the effluent quality criteria in the Water Licence similar to the effluent quality criteria set in other NWB water licences for similar undertakings.

This introduction is intended to discuss the options for selecting effluent quality criteria (EQC) to discharge to the environment and presents the Board undertaken option for the effluent quality criteria applied to this Project.

As outlined by the Mackenzie Valley Land and Water Board[3], "*Effluent Quality Criteria define the maximum allowable concentrations (mg/L) or limits (pH range) of any contaminant or parameter of the waste which, in the Board's opinion has the potential to adversely affect water quality in the receiving environment*".

Maximum acceptable concentrations (or limits) of certain substances in an effluent are set in a Water Licence in order to authorize the effluent discharge; these limits are, primarily, to be consistent with the Board's mandate to protect the freshwater environment. Effluent Quality Criteria or effluent quality limits may be based on either technology (*Technology Based Effluent Limits*) or water quality standards (*Water Quality Based Effluent Limits*).

Water Quality Based Effluent Limits
Particularly, *Water Quality Based Effluent Limits* are established in order to ensure that the quality standards for the waters in the receiving environment, as defined by the Canadian Council of Minister of the Environment (CCME), are met. Modeling is required in order to assess the impact of an effluent discharge on the quality of the receiving water. The result of the modeling is then compared to the applicable water quality criteria to determine whether or not the discharge has an impact on the water quality of the receiving water body. However, as discussed in other NWB licences[4], the *Water Quality Based Effluent Limits* are not strictly applicable when, and this is the case, there is no direct discharge of effluent into a water body or stream.

According to the Water Licence "*all effluent discharge shall be located at least thirty-one (31) meters above the ordinary High Water Mark of any water body, at a site where direct flow into a water body is not possible and no additional impacts are created "*. Also, it should be noticed that the QE's Environmental Waste Processing Facility is located within the limits of the City of Iqaluit, approximately 700 m of the Koojesse Inlet (marine environment), where the City discharges the Sewage Lagoon and the Wastewater Treatment Plant effluents, and approximately 1 km away of the Sylvia Grinnell River; the listed above would be the closest water bodies to the Facility.

Technology Based Effluent Limits
A description of the Water Treatment Facility would be*; it contains a multi-step filtration system to treat the impacted water. Water is initially passed through an oil/water separator and particulate filter to remove free product and suspended solids. Following the initial filtration, water is then circulated through Sanexen's patented ULTRASORPTION TM filters and activated carbon filters to remove organic chemicals. Inorganic contamination may be removed through precipitation or filtration through various media (e.g. ion-exchange resine). The treated water is then stored in clean tanks for sampling and analysis in a CALA certified laboratory to ensure it respects the NWB criteria prior to discharge*[5].

[3] MVLWB Water and Effluent Quality Management Policy, March 31, 2011
[4] 2BB-BOS1727 and 2BB-MAE1727
[5] QE's Operation and Management Plan Contaminated Water Treatment Unit, dated February 2016

Technology Based Effluent Limits are end of discharge pipe limits and do not take into account the quality of water into which the discharge is made. The limits must be consistent with the water quality objectives assigned to the source; if no water quality objectives have been established for a particular source of water, best professional judgment is applied to set the permit limits. Application of this approach relies on the efficacy of the wastewater treatment technology, which in turn generally depends upon of the influent water matrix, pH and temperature.

Alternatively, the Effluent limits can be determined by reviewing the available information on effluent quality conditions that are achieved by other facilities that are applying the best-available technologies to wastewater streams with similar chemical characteristics.

The NWB acknowledges that in order to opt for the *Technology Based Effluent Limits' approach,* the Board 's decision needs to be supported by far more detailed information, including the water quality objectives of the surrounding freshwater environment; a history of treated effluent quality data; a history of effluent quality data from other facilities that are applying the best-available technology to wastewater streams with similar physico-chemical characteristics, etc.

To establish an *Effluent Quality Criteria - EQC* the main point to consider is the protection of the freshwater environment; the established EQC shall protect the environment but also at the same time shall have *limits that proponents can reasonable and consistently achieve*[6]. Also the EQC should be look at in a holistic way; the Licensee compliance with the conditions of a Licence, including adherence to effluent quality criteria, management plans, and monitoring programs will ensure that any potential adverse effects on other water users - which might arise as a result of the effluent discharge- will be minimized

Following this, the Board considers that the approach proposed by the Licensee, to set the Effluent Quality Criteria in the Water Licence similar to the effluent quality criteria set in other NWB water licences for similar undertakings can be a valid approach as long as the EQC set using this method are considered "interim" EQC, susceptible of change, if required, and the criteria are coupled with the Licensee adherence to Management Plans and to the Licence Monitoring Program. In order to establish interim Effluent Quality Limits for the discharge of the treated effluent from the WTF, the following information have been considered:

1) Water Licences for similar undertakings:

Effluent Quality Criteria included in the following documents have been considered and are presented in Table A (attached):

- Mackenzie Valley Land and Water Board (MVLWB)'s Water Licence No. MV2014L-1-005 Amendment No.1 Type "B" Licence; it authorizes KLB Environmental Ltd *to accept hydrocarbon impacted soils, snow and ice and to dispose waste in association with the Yellowknife Soils and Water Treatment Facility* located within the municipal boundaries of the City of Yellowknife.

[6] MVLWB Water and Effluent Quality Management Policy, March 31, 2011

- MVLWB's Water Licence No. MV2009L8-0008 Amendment Type "A" Licence; it authorizes Aboriginal Affairs and Northern Development Canada – Contaminants and Remediation Directorate *to conduct activities associated with the remediation of the abandoned gold mining and milling operations at the Tundra Mine Site*, located near Bulldog Lake in the NWT.

- NWB Water Licence No. 1BR-MDR1721 Type "B"; it authorizes Transport Canada the use of water and deposit of waste during remediation of the Iqaluit Former Vehicle Dump and Community Landfill, located approximately 1.7 km southwest of the City of Iqaluit, close to the Sylvia Grinnell River.

2) The GN *Environmental Guideline for Industrial Waste Discharge into Municipal Solid Waste and Sewage Treatment Facilities* (the Guidelines for Industrial Discharge).

The effluent discharge criteria included in the GN Guidelines is also included in Table A (attached). With respect to these guidelines, they establish quality limits on the waste that can be disposed of into Nunavut municipal waste management facilities. Particularly, according to the Guidelines, if a process effluent meets the Guideline for Industrial Discharge relevant criteria then, the effluent can be discharged to the municipal sewage system. Also, it indicates that if the discharge is authorized by a Water Licence, it is not subject to the Guidelines for Industrial Discharge.

Following this, the Board has amended conditions in the Existing Water Licence concerning to the EQC, and it has

- Set in the Water Licence more stringent limits that those proposed by the Licensee. More stringent, site-specific limits may be set on the basis of treated effluent monitoring results provided by the Licensee. These limits were agreed with the Licensee by email and they take into consideration the fact that the facility is a waste treatment facility and that the effluent should be treated to reach the maximum attainable effluent quality.

- Set in the Water Licence condition requesting the Licensee to consistently monitor soil and groundwater quality. Given that the treated effluent is discharged onto land, new conditions are included aimed to the monitoring of soil and groundwater. In this way, monitoring data pertaining to the relevant environmental media (soil and groundwater) would provide indication if there is any impact caused by the discharge to the environment[7].

- Request the Licensee to submit with the 2017 Annual Report an addendum to the Report; in the addendum the Water Treatment Facility best achievable treatment levels should be discussed.

Also, conditions under *Part E, Items 4, 6 and 7* have been amended to correct typos where the Environmental Waste Processing Facility, EWPF was wrongly denoted by EWTF.

[7] USEPA at https://cfpub.epa.gov/roe/chapter/land/contaminated.cfm

The Board reserves the right to change the Effluent Quality Criteria if monitoring data of either soil or groundwater indicates changes in the levels of concentration of the contaminants in the media.

DECISION

On July 31, 2017, the Nunavut Water Board received an amendment application and supporting information (Application) from Qikiqtaaluk Environmental Inc. (QE or the Licensee or the Applicant) for the amendment of the discharge limits established under *Part E, Item 14* of the Existing 1BR-THI1722 Water Licence to take into account technology based limitations and to replace the limits under the above mentioned condition with new proposed limits.

On August 3, 2017 the NWB distributed the Application for a twenty (20) day public review period. Comments were received from AANDC – Water Resources Division and Environment and Climate Change Canada. There was no objection in principle to any potential decision that will result in the Board's amending the terms and conditions in the Licence in accordance with the Licensee's request.

Pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada and the Nunavut Waters and the Nunavut Surface Rights Tribunal Act*, with respect to the Application for amendment dated July 27, 2017 made by Qikiqtaaluk Environmental Inc., the Nunavut Water Board hereby grants the following licence amendment.

The Licence issued May 4, 2017 with an expiry date of May 3, 2022 shall be amended to include the following terms and conditions, with respect to the deposit of waste for an Industrial Undertaking classified as per Schedule 1 of the Regulations at the Environmental Waste Processing Facility, located within the community boundaries of the City of Iqaluit, in the Qikiqtani Region of Nunavut.

The Licence shall be amended as follows:

PART B: **GENERAL CONDITIONS**

Insert Item 1m The Licensee shall, for the first Annual Report following issuance of the Amended Licence, include a discussion of the Water Treatment Facility best achievable treatment levels.

PART E: **CONDITIONS APPLYING TO WASTE DISPOSAL**

Remove Item 4

Insert Item 4 The Licensee shall implement appropriate measures to minimize erosion during any discharge of Effluent from the EWPF into the receiving environment.

Remove Item 6

Insert Item 6 The Licensee shall operate and maintain the EWPF to the satisfaction of an Inspector and in accordance with acceptable engineering standards and the corresponding approved Operation and Maintenance Plans.

Remove Item 7

Insert Item 7 The Licensee shall operate and maintain the EWPF to engineering standards such that:

a. During periods of flow, the Licensee shall carry out, at a minimum, weekly inspection of the berms and keep records for review upon the request of an Inspector. Areas of deterioration and erosion shall be repaired immediately;

b. Monitoring Wells shall be monitored in accordance with the Monitoring Plan as per Part J of the Licence and should analytical results indicated contamination associated with the Facility, the Licensee shall implement immediate corrective action; and

c. Washing of all rock reject from soil stockpiles shall be done within the berms of the Soil Treatment Facility (STF).

Remove Item 14

Insert Item 14 All Effluent discharged from Monitoring Program Station **THI -1a** shall not exceed the following Effluent quality criteria:

Parameter	Maximum Concentration of any Grab Sample
pH	6.0 -9.0
Total Suspended Solids	50 mg/L
Oil and Grease	15 mg/L and no visible sheen
Benzene	0.370 mg/L
Toluene	0.002 mg/L
Ethylbenzene	0.090 mg/L
Total Lead	0.050 mg/L
Total Arsenic	0.050 mg/L
Total Cadmium	0.010 mg/L
Total Copper	0.025 mg/L
Total Mercury	0.0006 mg/L
Total Silver	0.005 mg/L
Total Zinc	0.20 mg/L

Remove Item 15

Insert Item 15 The Licensee shall, for the purposes of monitoring the groundwater beneath the site where the WTF's treated effluent as per *Part E, Item 14* is discharged, install ground water monitoring wells. The ground water monitoring wells shall be installed in such way that at least one is up-gradient of the location where the treated effluent is discharged and two down-gradient of that location.

PART J: **CONDITIONS APPLYING TO THE MONITORING PROGRAM**

Remove Item 1

Insert Item 1 The Licensee shall establish and maintain, at a minimum, the following Monitoring Program Stations or as otherwise approved by the Board in writing:

Monitoring Station ID	Description	Frequency	Parameters
THI-1 a	Monitoring Station at new location of the WTF, treated effluent prior to be reused for equipment cleaning discharged to the environment	as per Part J, Item 3	Volume as per Part J, Item 2, Quality as per Part J, Item 5
THI-2 & THI-3	Monitoring Stations at the EWPF, surface contact water and seepage up gradient and down gradient, collected from the perimeter of the Facility (drainage ditches)	As per approved Environmental Protection Plan	Quality as per Part J, Item 6
THI-4A	Monitoring well installed up- gradient of the STF	Once during spring freshet, and once during late summer	Quality as per Part J, Item 6
THI-4B	Monitoring well installed up-gradient of the site where the WTF treated effluent is discharged	Once during spring freshet, and once during late summer	Quality as per Part J, Item 6
THI-5A	Monitoring well installed down-gradient of the STF	Once during spring freshet, and once during late summer	Quality as per Part J, Item 6
THI-5B	Monitoring well installed down-gradient of the site where the WTF treated effluent is discharged	Once during spring freshet, and once during late summer	Quality as per Part J, Item 6
THI-6A	Monitoring well installed down-gradient of the STF	Once during spring freshet, and once during late summer	Quality as per Part J, Item 6
THI-6B	Monitoring well installed down-gradient of the site where the WTF treated effluent is discharged	Once during spring freshet, and once during late summer	Quality as per Part J, Item 6
THI-7	Reference or Control Area for soil monitoring (determined by the Licensee directed by Inspector)	Once a year at the same time that THI-8 monitoring is carried out	Quality as per Part J, Item 17
THI-8	Soil monitoring at the location where the WTF Effluent is discharged	Once a year after treated effluent from the WTF is discharged	Quality as per Part J, Item 17

Remove Item 6

Insert Item 6 The Licensee shall sample at Monitoring Stations No. THI-1a, THI-2, THI-3, THI-4A, THI-4B, THI-5A, THI-5B, THI-6A and THI-6B with a frequency as established under Part J, Item 1. Samples shall be analyzed for the parameters

included under Part J, Item 5.

Insert Item 17 The Licensee shall sample at Monitoring Stations No. THI-7 and THI-8 with a frequency as established under Part J, Item 1. Samples shall be analyzed for the following parameters:

pH	Benzene
Ethylbenzene	Toluene
Xylene	Phenol
Polychlorinated Biphenyls	Arsenic total and inorganic
Cadmium total and inorganic	Chromium total
Copper total	Lead total
Mercury total and inorganic	Nickel total
Silver total	Total Petroleum Hydrocarbons in soil

All remaining terms and conditions of Licence No. 1BR-THI1722 Type "B" dated May 4, 2017 still apply.

This Licence Amendment No. 1 issued and recorded at Gjoa Haven, NU on September 15, 2017

Lootie Toomasie
Chair
Nunavut Water Board

Table A: Effluent Quality Criteria for Similar Undertakings

Water Licence	MVLWB[8] No. MV2014L-1-005 Amendment No.1[9]	MVLWB No. MV2009L8-0008 Amendment[10]		NWB No. 1BR-MDR1721[11]	GN- Guidelines for Industrial Discharge[12]
Effluent	Treated Effluent from the Treated Water Tank to be used on the Biotreatment Pad	Treated Effluent from the Tailing Containment Area to be discharged into Hambone Lake	Treated Effluent from the Equipment Decontamination Wastewater Treatment Facility	Effluent discharged from the Former Iqaluit Metal Dump Remediation Project	Process Effluent that meets all the criteria established in Column 1 of Table 1 may be discharged to a municipal sewage treatment system
Parameter	**Maxim Concentration in any Grab Sample in mg/L**	**Maxim Concentration in any Grab Sample in mg/L**	**Maximum Allowable Concentration in mg/L**	**Maxim Concentration in any Grab Sample in mg/L**	**Process Effluent mg/L**
Total Lead	N	0.020	0.100	0.050	5.00
Total Arsenic	0.050	1.000	0.020	0.100	1.00
Total Cadmium	N	N	N	0.010	2.00
Total Copper	N	0.020	0.020	0.200	5.00
Total Nickel		0.100	0.040	0.200	5.00
Total Mercury	N	N	N	0.0006	0.10
Total Silver	N	N	N	N	5.00
Total Zinc	0.030	0.040	N	0.500	5.00

[8] MVLWB: Mackenzie Valley Land and Water Board
[9] MVLWB, Dated September 8, 2016
[10] MVLWB, Dated August 28, 2013
[11] NWB, dated July 31,2017
[12] Environmental Guideline for Industrial Waste Discharges into Municipal Solid Waste and Sewage Treatment Facilities, Gov. of Nunavut, revised April 2011